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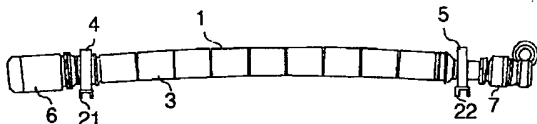
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(54) AGENCEMENT D'ENTRAINEMENT POUR CYLINDRE D'ENDUCTION

(54) ARRANGEMENT IN CONNECTION WITH A SPREADER ROLL DRIVE

(57)

The invention relates to an arrangement in connection with a spreader roll drive where the driving motor (6) is directly connected to one end of the spreader roll (1). The supports (4, 5) of the spreader roll (1) comprise rubber rings (19) which are flexible and will receive the angular changes. The motor (6) shaft (8) comprises an extension shaft (14), connected to rotate the roll segments (3) placed on bearings on the arched shaft (2).



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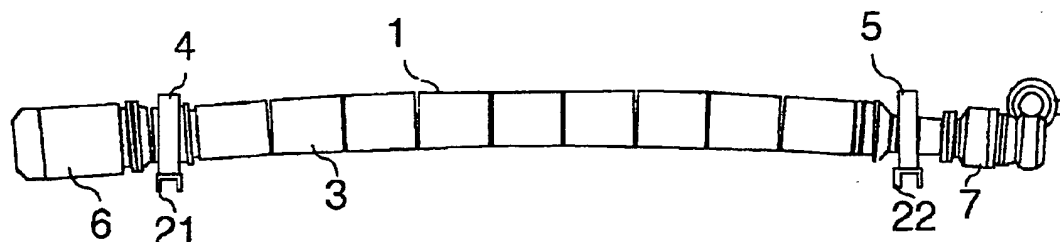
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(54) Title: ARRANGEMENT IN CONNECTION WITH A SPREADER ROLL DRIVE



(57) Abrégé/Abstract:

The invention relates to an arrangement in connection with a spreader roll drive where the driving motor (6) is directly connected to one end of the spreader roll (1). The supports (4, 5) of the spreader roll (1) comprise rubber rings (19) which are flexible and will receive the angular changes. The motor (6) shaft (8) comprises an extension shaft (14), connected to rotate the roll segments (3) placed on bearings on the arched shaft (2).

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Abstract

The invention relates to an arrangement in connection with a spreader roll drive where the driving motor (6) is directly connected to one end of the spreader roll (1). The supports (4, 5) of the spreader roll (1) comprise rubber rings (19) which are flexible and will receive the angular changes. The motor (6) shaft (8) comprises an extension shaft (14), connected to rotate the roll segments (3) placed on bearings on the arched shaft (2).

(Figure 2)

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## ARRANGEMENT IN CONNECTION WITH A SPREADER ROLL DRIVE

### FIELD OF THE INVENTION

5 This invention relates to spreader roll drives and more particularly to an arrangement in connection with a spreader roll drive and even more particularly to a spreader roll drive apparatus.

### RELATED ART

10 An arched, bent spreader roll may be used for spreading for instance web material, such as paper, textiles and film webs. Several arrangements are known from prior art of flexibly coupling up roll segments to transmit torque from one segment to another.

15 The construction of the spreader roll, where the roll segments rotate around a fixed shaft, has complicated the placement of the drive. In previously known constructions the fixed shaft has been supported by spherical bearings, which have formed the support. The spherical surface has allowed rotation of the fixed shaft, causing a change in the angle between the support and the shaft. Until now, the actual driving motor has been connected to the support structure of the driving end so that a worm gear has been placed on  
20 the outer periphery of the spherical surface, where it has been allowed to rotate, driven by a transverse worm screw. A support containing a worm gear has an expensive structure. Moreover, the driving motor is placed transversely against the fixed shaft. The previously known construction also includes a plurality of sliding surfaces that are quite arduous to maintain and  
25 expensive to manufacture. Adjustment of the speed of rotation of electric motors is quite advanced, and thus there is no need to use reduction gears in present drives.

### SUMMARY OF THE INVENTION

30 The present invention may simplify the use of a spreader roll and provide a modern arrangement of connecting the drive. Significant

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advantages compared with known solutions are achieved by connecting the driving motor directly to the end of the spreader roll.

The arrangement and apparatus described herein significantly improves the way in which spreader rolls are driven and reduces costs. The supports may be of rolling bearing type with a diameter smaller than in previous constructions. The locations of the supports may be more freely chosen as the driving motor is directly at the other end of the spreader roll. No cogwheels are needed as the drive is directly connected to the spreader roll by means of a separate clutch and an extension shaft of the motor shaft. The supports of the spreader roll are also essentially simplified. The supports may comprise a metal ring with a flexible rubber ring inside for receiving the angular changes caused by the arching of the spreader roll. The support also operates as a spring and it will sustain the stresses it will be subjected to better than the spherical metal surfaces of earlier designs.

In accordance with one aspect of the invention, there is provided a spreader roll drive apparatus. The apparatus includes supports supporting both ends of the spreader roll, a motor for driving the spreader roll, a fixed, bent shaft on which a plurality of flexibly coupled up roll segments is rotatably arranged, and a gear with a drive for changing the angle of the fixed shaft around its centre axis. The driving motor is directly connected to one end of the spreader roll in the axial direction, and the supports of the spreader roll comprise rubber rings or the like, which are flexible and will thus receive angular changes in the fixed bent shaft caused by arching of the spreader roll due to changes in the angle of the fixed bent shaft about its centre axis.

The apparatus may include a clutch connecting the motor shaft to an extension shaft having a bearing cap arranged inside the rubber ring of the support.

The apparatus may further include a motor rigidly fastened by a flange by means of screws to a flange in a clutch housing, and a bearing cap may be rigidly fastened at its end to the clutch housing.

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The apparatus may further include an end of an extension shaft on the side of the spreader roll, having an enlargement with an aperture for receiving an end of the bent shaft.

5 The apparatus may further include a segment located at the end near the motor, the segment being connected by means of a support block to an enlargement of an extension shaft and a bearing cover.

10 In accordance with another aspect of the invention there is provided a spreader apparatus comprising a spreader roll comprising a fixed bent shaft operable to be rotated about its centre axis, a plurality of flexibly coupled roll segments rotatably arranged on the fixed bent shaft, extension shafts coupled to respective roll segments at opposite ends of the spreader roll, the extension shafts cooperating with respective opposite ends of the bent shaft to support the opposite ends while being rotated relative to the bent shaft, provisions for directly connecting a motor to one end of the spreader roll, by at  
15 least one of the extension shafts, for driving the spreader roll and supports for supporting opposite ends of the spreader roll, the supports comprising flexible members operable to flexibly support respective extension shafts to permit the extension shafts to vary in angle relative to the supports when the bent shaft is rotated about its centre axis.

20 The flexible members may comprise flexible rings and the flexible rings may comprise rubber rings.

Bushings may be provided on the extension shafts, bearing caps may be provided on the flexible members and bearings may be provided between respective sets of bushings and bearing caps to rotatably support the  
25 extension shafts by the flexible members.

The provisions for directly connecting a motor to one end of the spreader roll may comprise a clutch for connecting the motor to an extension shaft. The clutch may comprise a housing connected to at least one of the bearing caps, and a flange operable to cooperate with a flange on the motor  
30 to permit forces to be transferred between the motor and the clutch.

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The apparatus may include a motor having a shaft having a flange, the motor being connected to the clutch housing and the flange of the motor being connected to the flange of the clutch.

5 The extension shafts may have respective enlargements having respective apertures for receiving opposite ends of the fixed shaft respectively, therein.

The apparatus may further include provisions for rotating the fixed shaft about its centre axis and such provisions may include a gear connected to at least one end of the fixed shaft.

10

#### BRIEF DESCRIPTION OF THE DRAWINGS

In the following, embodiments of the invention will be described in greater detail with reference to the accompanying drawings.

15 Figure 1 is a side view of an arched spreader roll apparatus according to a first embodiment of the invention.

Figure 2 is a partial cross-sectional view of one end of the apparatus shown in Figure 1.

#### DETAILED DESCRIPTION

20 In Figures 1 and 2, numeral 1 denotes a spreader roll according to a first embodiment of the invention. Numeral 2 denotes a fixed shaft of the spreader roll. Numeral 3 denotes parts of a roll jacket, i.e. roll segments, arranged on the shaft 2. Numerals 4 and 5 denote supports of the spreader roll. A driving motor is denoted by numeral 6. The shaft 2 is rotated by a gear 7 around its centre axis. A motor 6 shaft is denoted by numeral 8. A motor 6 flange 9 is fastened by means of screws 10 to a flange 12 in a clutch housing 11. A clutch 13 connects the motor 6 shaft 8 and an extension shaft 14. The motor 6 shaft 8 and the extension shaft 14 comprise wedges 15 or the like, by means of which they will be locked into the clutch 13. A bearing cap 16 is 25 rigidly fastened at its end to the clutch housing 11. A bushing 17 is arranged on the extension shaft 14 and rolling bearings 18 are arranged between the bushing 17 and the bearing cap 16. The bearing cap 16 is arranged inside a 30

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rubber ring 19 or the like, placed inside the support 4. The support 4 is strengthened with a metal ring 20, fastened to a beam 21. The construction of the support 5 is similar to that of the support 4 and it is fastened to a beam 22. One end of the extension shaft 14 comprises a shoulder 23 and an enlargement 24, at the end of which an aperture 25 is arranged for the shaft 2. The end of the shaft 2 comprises a thinner section 26, around which a bushing 27 is arranged. Bearings 28 are arranged in the bushing 27. A cover 29 for the bearings 28 is fastened to the segment 3. The bearing 28 cover 29, the enlargement 24 of the extension shaft 14 and the segment 3 are coupled up so that they rotate around the shaft 2. The segment 3 and the bearing 28 cover 29 are coupled up by means of support blocks 30.

The arrangement in connection with the spreader roll drive operates in the following way. The roll segments 3, flexibly coupled up and placed on bearings on the arched shaft, rotate around the shaft 2 and follow the shape of the shaft. The operating speed of the motor 6 is adjusted by means of a frequency transformer or the like. The motor 6 shaft 8 is via the clutch 13 directly connected to the extension shaft 14, which is via its enlargement 24 connected to the segment 3, farthest at the end near the motor 6. Because of the rolling bearing arrangement formed by the bearings 28, the segment 3 rotates around the shaft 2. An angle conforming to the thinner section 26 of the shaft 2 determines the position of the extension shaft 14 and, via the therein arranged rolling bearings 18, the position of the bearing cap 16. Being flexible, the rubber ring 19 of the support 4 yields and the bearing cap 16 is placed in a position determined by the thinner section 26 of the shaft. The clutch 13 housing 11 is rigidly fastened to the bearing cap 16 and the motor 6 is fastened by means of flanges 9, 12 to the clutch 13 housing 11. Because of the rubber ring 19 and the clutch 13, the coupling of the motor 6 shaft 8 is, however, not completely rigid, but shows certain flexibility.

It will be understood by those skilled in the art that the above is a description of one embodiment of the invention only. Within the scope of the inventive idea, the machine element solutions applied to the arrangement of the invention may be modified quite widely. The extension shaft 14 may be of

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5 another type than in the above described solution, and it may be fastened to the segment in a different way than in the solution of this application. The bearings **18** and **28** may be realized as a different solution, and their places may be somewhat changed. Moreover, the number of bearings may be different than in the above described embodiment. A different type of clutch may be used in place of the clutch **13**.

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**THE EMBODIMENTS OF THE INVENTION IN WHICH AN EXCLUSIVE  
PROPERTY OR PRIVILEGE IS CLAIMED ARE DEFINED AS FOLLOWS:**

1. A spreader roll drive apparatus comprising:

5

supports supporting both ends of the spreader roll;

a motor for driving the spreader roll;

10

a fixed, bent shaft on which a plurality of flexibly coupled up roll segments is rotatably arranged; and

a gear with a drive for changing the angle of the fixed bent shaft around its centre axis;

15

wherein the driving motor is directly connected to one end of the spreader roll in the axial direction, and the supports of the spreader roll comprise rubber rings or the like, which are flexible and will thus receive angular changes in the fixed bent shaft caused by arching of the spreader roll due to changes in the angle of the fixed bent shaft around its centre axis.

20

2. The apparatus of claim 1, further comprising a clutch connecting a motor shaft to an extension shaft having a bearing cap arranged inside the rubber ring of the support.

25

3. The apparatus of claim 1, wherein the motor is rigidly fastened by a flange by means of screws to a flange in a clutch housing, and wherein a bearing cap is rigidly fastened at its end to the clutch housing.

30

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4. The apparatus of claim 1, wherein the end of an extension shaft on a side of the spreader roll comprises an enlargement with an aperture for receiving an end of the bent shaft.

5 5. The apparatus of claim 1, wherein a segment located at the end near the motor is connected by means of a support block to an enlargement of an extension shaft and a bearing cover.

6. A spreader apparatus comprising:

10 a spreader roll comprising a fixed bent shaft operable to be rotated about its centre axis;

a plurality of flexibly coupled roll segments rotatably arranged on

15 said fixed bent shaft;

extension shafts coupled to respective roll segments at opposite ends of the spreader roll, said extension shafts cooperating with respective opposite ends of the bent shaft to support said

20 opposite ends while being rotated relative to said bent shaft;

means for directly connecting a motor to one end of the spreader roll, by at least one of said extension shafts, for driving the spreader roll; and

25 supports for supporting opposite ends of the spreader roll, said supports comprising flexible members operable to flexibly support respective said extension shafts to permit said extension shafts to vary in angle relative to said supports when

30 said bent shaft is rotated about its centre axis.

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7. The apparatus of claim 6 wherein said flexible members comprise flexible rings.
- 5 8. The apparatus of claim 7 wherein said flexible rings comprise rubber rings.
9. The apparatus of claim 7 further comprising bushings on said extension shafts, bearing caps on said flexible members and bearings between respective sets of bushings and bearing caps to rotatably support said extension shafts by said flexible members.
- 10 10. The apparatus of claim 9 wherein said means for directly connecting a motor to one end of the spreader roll comprises a clutch for connecting the motor to an extension shaft.
- 15 11. The apparatus of claim 10 wherein said clutch comprises a housing connected to at least one of said bearing caps, and a flange operable to cooperate with a flange on the motor to permit forces to be transferred between the motor and the clutch.
- 20 12. The apparatus of claim 11 further comprising a motor having a shaft having a flange, said motor being connected to said clutch housing and said flange of said motor being connected to said flange of said clutch.
- 25 13. The apparatus of claim 6 wherein said extension shafts have respective enlargements having respective apertures for receiving opposite ends of said fixed shaft respectively, therein.
- 30 14. The apparatus of claim 6 further comprising means for rotating the fixed shaft about its centre axis.

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15. The apparatus of claim 14 wherein said means for rotating comprises a gear connected to at least one end of said fixed shaft.

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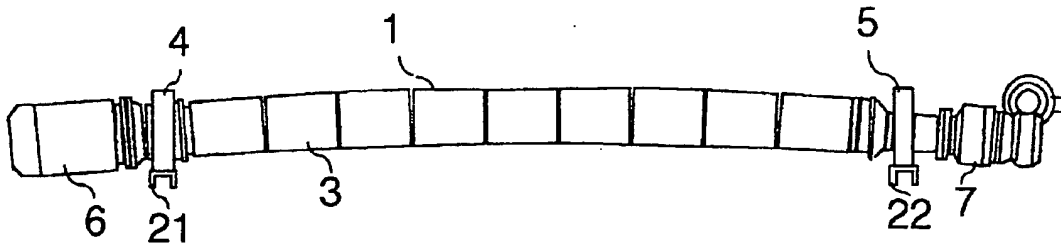


FIG 1

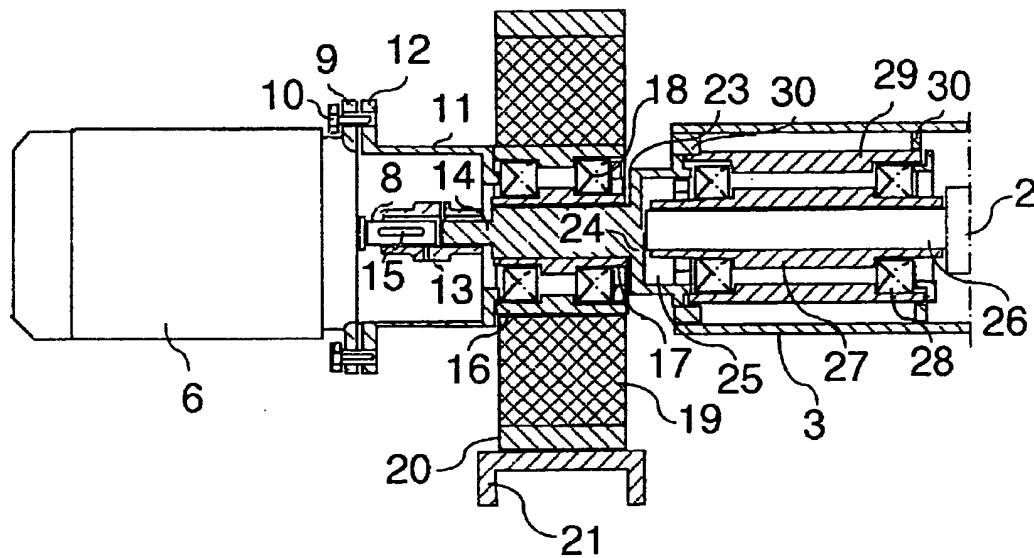


FIG 2